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**AN ANALYSIS OF
SMALL BUSINESS SIZE
AND RATE OF
DISCONTINUANCE**

by

Timothy Bates* and Alfred Nucci**
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*Research Fellow, American Statistical Association and Department of Economics at the University of Vermont#

**U.S. Bureau of the Census

Abstract

This study investigates small business failure rates in relation to several measures of firm size. Utilizing the new Characteristics of Business Owners (CBO) data base, a nationwide sample of firms is utilized that is representative of the small business universe. One subset--small business employers--is shown to have relatively low rates of failure, while another group--very small firms with no employees--exhibits relatively high rates of business discontinuance. The finding that the probability of firm failure is strongly (inversely) related to firm size is shown to hold up as well when the age of the business is controlled for.

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A. Introduction

The proclamation that firms employing fewer than 20 workers "have created about 88 percent of all net new jobs" in the 1980s is only one of the numerous expressions of renewed interest in small business.¹ According to David Birch, the aggregate growth in employment forthcoming from the great American job creation machine--the nation's small business sector--has at its base a great volatility, "a foundation of massive, continual failure."² If this is indeed the case, then the volatility of the small business community may preclude the possibility of sustained employment for much of the growing portion of the labor force that works in this sector. Birch emphasizes this point most succinctly when he states: "Firms rise and fall. Jobs are created and then vanish. Everyone in the labor force must constantly ask: Do I have the right job? How long will it last? What should I do next?"³

This study critically examines the premise of massive, continual small business failure. Among small firms with paid employees, our finding is that discontinuance (or failure) rates are not "massive." Among small firms with 5 to 19 employees, for example, annual rates of business discontinuance are close to three percent. Among the largest small business employers,

¹David Birch, Job Creation in America (New York: Free Press, 1987) p. 16.

²Ibid., p. 51.

³Ibid., p. 166.

annual discontinuance rates are less than one percent during the 1982-86 time period. The measured rate of discontinuance among small firms is highly dependent upon the definition of what is/is not a small business. This study presents discontinuance rate estimates for a broadly defined small business universe as well as enterprise subsets that are defined by gross receipts categories and employment. Discontinuance rates are inversely related to firm size, whether "size" is measured by employment levels or gross sales revenues.

B. Small Business Discontinuance

According to the Small Business Administration (SBA), there was 15.3 million businesses operating nationwide in 1985.⁴ Nearly one third of these "firms" consisted of individuals--utilizing no paid employees--who were pursuing self-employment on a part-time basis. SBA's broad concept of small business derives from the practice of utilizing income tax returns to define the applicable universe: those explicitly defined as small businesses include 1) everyone filing a schedule C (form 1040) "profit or loss from business or profession," 2) those filing a form 1065 "U.S. partnership return of income," or 3) those filing form 1120s "U.S. small business corporation income tax return." Other corporate filers are often classified as "small businesses" based on such criteria as annual total revenues or employment

⁴State of Small Business: Report of the President, 1986 (Washington, DC, Small Business Administration, 1987), p. 9.

levels. According to Birch, "there are about seven million companies, close to 90 percent of which employ fewer than 20 workers." His definition of "small business" and "company" are not precisely stated. SBA indicates that approximately five million firms with employees existed in 1985; this group appears to encompass the small business universe that is applicable to job creation issues.

This study utilizes the Characteristics of Business Owners (CBO) survey, compiled by the U.S. Bureau of the Census in 1987, to estimate discontinuance rates for the small business universe and various enterprise subsets. According to IRS data, about 12 million proprietorships, partnerships and small business corporations existed in 1982. The CBO survey was drawn from this tax return defined universe.⁵ In August 1986, questionnaires covering both owner traits and business traits were sent out to 125,000 persons who owned businesses in 1982. This survey produced an 81 percent response rate, and the questionnaires provided the basis for constructing the CBO data base, which is the empirical basis of this study. The CBO data analyzed below are weighted by 1) legal form of organization, 2) industry mix, 3) geographic location, and 4) owner demographic traits, to be representative of the 1982 small business universe of proprietorships, partnerships and small business corporations.

⁵The CBO data base is described in, Bureau of the Census, 1982 Characteristics of Business Owners (Washington, DC: Government Printing Office, 1987), pp. III-V.

Table one is based upon owner responses to the CBO survey question, "Is the business you owned in 1982 still operating?" Businesses are defined as discontinued if the owner's response was "no." In cases where multiple owners of one firm existed, one response per firm was permitted for purposes of this study. Over 9,000 sample observations were dropped because they represented multiple owners of partnerships or corporations. Table one indicates that 34.0 percent of the small businesses that were in existence during 1982 had discontinued operations by late 1986. Among firms reporting 1982 sales of less than \$5,000, the discontinuance rate was 49.3 percent, while at the other end of the size spectrum, 8.2 percent of the firms with sales exceeding one million had discontinued operations. Table one clearly indicates that discontinuance rates are inversely related to firm size, with very small businesses accounting for the bulk of the 1982 universe that had discontinued business operations by late 1986.

Table two summarizes discontinuance rates for the small business employer subset of the CBO data base. Number of employees is measured during the March 12, 1982 pay period; firms with zero employees are defined as employers if their annual payroll was at least \$2,500. Utilizing the number of employees as a measure of firm size, table two indicates that firm size--as in table one--is inversely related to firm discontinuance rates. Firms with fewer than five employees accounted for 76.3 percent

(table two) of the small business employers and these same businesses accounted for 28.1 percent of the employee total. Employees working for these smaller firms run the greatest risk of losing their jobs due to discontinuance of business operation by their employers. Firms with 20 or more employees made up 3.4

Table one: The Distribution of Small Business by Sales and Rate of Discontinuance

<u>1982 total sales revenues</u>	<u>Percent of all small firms in this size category</u> (cumulative percentage)	<u>Percent of firms in this size category discontinuing operations by late 1986</u>
under \$5,000	38.9%	49.3%
\$5,000-\$9,999	12.95% (51.8%)	35.5%
\$10,000-\$24,999	16.3% (68.2%)	29.1%
\$25,000-\$49,999	10.8% (79.0%)	21.5%
\$50,000-\$99,999	8.9% (87.8%)	17.8%
\$100,000-\$199,999	6.1% (93.9%)	14.4%
\$200,000-\$499,999	4.1% (98.0%)	12.7%
\$500,000-\$999,999	1.2% (99.3%)	11.2%
\$1 million and up	<u>0.7%</u> (100.0%)	8.2%
all	<u>100.0%</u>	34.0%
all under \$50,000	79.0%	39.1%
all \$50,000 and up	21.0%	15.1%

Source: U.S. Bureau of the Census Characteristics of Business Owners Survey; unpublished data. These tabulations are based upon a sample size of 10,148,176 firms (weighted); the sample size (unweighted) is 86,118 firms.

**Table two: The Distribution of Small Business Employers by
Number of Employees and Rate of Discontinuance**

<u>Number of employees in 1982</u>	<u>Percent of employer small firms in this employee category</u>	<u>Percent of firms in this employee category discontinuing operations by late 1986</u>
0*	10.2%	22.3%
1-4	66.1%	16.7%
5-9	14.9%	11.8%
10-19	5.5%	13.8%
20-49	2.4%	8.5%
50+	<u>0.9%</u>	<u>2.78%</u>
all	<u>100.0%</u>	<u>16.1%</u>

Source: U.S. Bureau of the Census Characteristics of Business Owners Survey; unpublished data.

*Firms reporting zero employees during the March 12, 1982 pay period were counted as employers if their annual payroll was at least \$2,500.

percent (table two) of the employer universe, and 33.9 percent of the small business employee pool worked for these same firms. Job loss due to discontinuance of business by their employers is less of a problem for these workers, particularly for those employed by the largest small businesses: firms with 50 plus employees had an annual discontinuance rate of under one percent per year over the 1982-86 time period.

Birch reports job losses as high as 52.5 percent among small firms that existed in 1969: this calculation is based solely upon firms that existed in 1969 but not in 1976, and it abstracts from jobs created by firms created after 1969.⁶ Among those small businesses with fewer than 20 employees, Birch estimates that 48 percent of the jobs that existed in 1969 had been lost by 1976 due to deaths among the employing firms. A comparable calculation indicates that among firms with less than 20 employees, 14.5 percent of the jobs that existed in March 1982 had been lost by August/September 1986 due to deaths among the employing firms. The CBO data do not support Birch's finding of massive job loss due to small business failure.

Our findings, however, do not constitute a definitive rejection of Birch's empirical job loss estimates. First, Birch investigated a different time period, one characterized by a severe recession; the time period we have investigated originated in a recession year, but it otherwise included years of steady

⁶Birch, Job Creation, p. 29.

macroeconomic expansion. Secondly, a 19 percent nonresponse rate characterizes our data base, the CBO survey. Yet if we adopt the extreme assumption that all survey nonrespondents represent business failures, we nonetheless observe rates of job loss due to small business discontinuance that are vastly lower than the Birch figures cited above. Our major finding, however, is only peripherally concerned with precise estimation of job loss numbers that are caused by small business failure in general. Rather, it is the strong inverse relationship between firm size and the likelihood of discontinuing operations that emerges so clearly from our examination of the CBO survey data. This finding is broadly consistent with the results of previous empirical studies of narrow subsets of the small business universe. In his analysis of Small Business Administration loan data, Bates found that a straightforward measure of firm size--the logarithm of total firm assets--had great explanatory power for delineating failed black-owned businesses from survivors.⁷ Firms (of all sizes) in 100 manufacturing industries, according to a study by Evans, exhibit survival rates that are a function of size and age: the larger, older firms are the ones that are most likely to remain in business.⁸

⁷Timothy Bates, "An Econometric Analysis of Lending to Black Businessmen," Review of Economics and Statistics (August 1973), pp. 276-80.

⁸David Evans, "The Relationship Between Firm Growth, Size and Age: Estimates for 100 Manufacturing Industries," The Journal of Industrial Economics (June 1987), pp. 573-76.

The impact of firm age on the likelihood of discontinuing business operations is highlighted in a recent study by Bates, which found that firms operating for three years or less have much higher failure rates than older, more established small businesses.⁹ Controlling for owner education, financial capital investment in the firms, and other factors, Bates found that firm age was the strongest single determinant of small business survival among firms owned by white males.

Since younger firms are typically smaller firms, these findings suggest that the inverse relationship between firm size and rate of discontinuance (tables one and two) may be complicated by the age factor. Indeed, a theoretical article by Jovanovic suggests that the inverse firm size/discontinuance rate relationship may, in fact, be more accurately characterized as an inverse relationship between small business age and rate of discontinuance.

Jovanovic's model of business growth and survival postulates that firms learn about their efficiency as they operate in their industry. One element of cost efficiency, according to Jovanovic, is a fixed factor input, "managerial ability": firms gradually learn about their managerial abilities by engaging in the actual running of a business and observing how well they do. This learning process produces decreasing variance in the firm's

⁹Timothy Bates, "Entrepreneur Human Capital Inputs and Small Business Longevity," Review of Economics and Statistics (forthcoming).

cost function over time as the firm's uncertainty about its managerial ability declines. As firms learn more about their abilities, their behavior changes through time: those who revise their ability estimates upward tend to expand output while those embracing downward estimates tend to contract or to dissolve their businesses: "efficient firms grow and survive; the inefficient decline and fail."¹⁰ Over time, surviving businesses acquire through experience precise estimates of their abilities; the younger firms exhibit relatively more variable behavior because they have less precise estimates of their true abilities. Because younger firms are commonly smaller firms, these behavior patterns are predicted to typify smaller and larger firms.

Small firms in the CBO data base behave in a manner that is broadly consistent with Jovanovic's characterizations of entrepreneurship. These nationwide samples of small firms are split into groups of younger and older businesses: the older firms, by definition, are owned by individuals who entered self-employment before 1976; the younger firms involve entry over the 1976-82 time period. Relative to the older firm groups, the younger businesses were 1) more likely to discontinue operations by late 1986, 2) smaller regarding 1982 annual sales, and 3) more dispersed around the sales mean values. The younger firms exhibit the less settled behavior that is consistent with Jovanovic's hypothesis that they are in the process of learning

¹⁰Boyan Jovanovic, "Selection and Evolution of Industry," Econometrica (May 1982), 99. 650-53.

what their managerial abilities are.

C. Discriminant Analysis: Firm Size, Age, and Survival

The theoretical and empirical studies discussed above introduce the possibility that the inverse relationship between firm size and rate of discontinuance (tables one and two) may reflect, instead, an inverse relationship between firm age and rate of discontinuance. Table three's discriminant analysis exercise indicates that firm size--measured as the logarithm of the 1982 calendar year total sales revenues--is indeed inversely related to discontinuance. The discriminant analysis dependent variable measure of firm viability is, by definition, whether or not the business is still operating in late 1986. Businesses that are still operating are "active" firms; those that have closed down are "discontinued." Explanatory variables, in addition to the log of sales, include two variables that are designed to identify the younger firm subsets of the CBO data base:

1. Time82: if the business was started or ownership was acquired during 1982, then Time82 = 1; otherwise Time82 = 0;
2. Time80: if the business was started or ownership was acquired during 1980 or 1981, then Time80 = 1; otherwise Time 80 = 0.

The discriminant function standardized coefficients reported in Table three permit comparisons of the relative explanatory power of the independent variables: log sales possesses the greatest

discriminating power, followed by time82 and time80. The objective of Table three's discriminant analysis is to weigh and combine the explanatory variables in a fashion that causes the groups to be as statistically distinct as possible. The exercise is successful in the sense that the active and discontinued firm groups are found to be statistically quite distinct ($F = 3649.5$).

The findings regarding time80 and time82 are supportive of Jovanovic's characterizations of entrepreneurship. The time82 variable identifies the newest of the businesses in the CBO sample: firms formed in 1982 accounted for 18.9 percent of the total sample and 29.7 percent of the discontinuances. Controlling for sales, the newest firms are shown to be the most likely to close down. Similarly, firms entered during the 1980-81 period (time80) were more likely to discontinue operations by 1986 than those who entered before 1980; they were less likely to discontinue relative to those entered in 1982. The longer the period since the owner entered his business, the more likely it is that the business will remain active in 1986.

Our findings are consistent with those reported in the Evans study of manufacturing firms: firm size and age both impact the likelihood of firm survival. Consistent with Jovanovic's model, younger firms are indeed observed to be smaller firms. Yet when firm age is controlled for (table three), we observe that a very strong, direct relationship exists between firm size and the likelihood of continuing business operations.

D. Concluding Remarks

Individuals with small amounts of intermittent self-employment income account for a minuscule portion of the employment generated (or GNP originated) in the small business sector. Yet it is this large group of very small operations that is most responsible for the "high failure rate" image of small businesses. An article of faith in the small business folklore

**Table three: Discriminant Analysis: Firms Still in Business
versus those that have Discontinued Business Operations**

<u>Variable</u>	Discriminant Function	Group Mean	
	<u>Coefficients</u>	<u>Vectors</u>	
	Standardized	Active	Discontinued
	coefficients	firms	firms
Log sales	.7566	9.5735	8.2807
Time80	-.3854	.2058	.2961
Time82	-.5322	.1331	.2973
n - unweighted*		52,523	27,693
n - weighted		6,237,628	3,212,665
weighted proportions		.660	.340

Wilks lambda = .8799

F = 3649.5, indicating that the group differences are statistically significant at the .01 level.

*Over 10,000 firms (unweighted) had to be deleted from table three's discriminant analysis exercise because of owner nonresponse to the question: "When did you acquire the ownership of your portion of this business?"

is the notion that most small businesses fail within a few years of their creation. Yet most of these discontinuances were tiny operations that have not paid employees. The numerically numerous but economically insignificant group of very small, frequently young firms that is responsible for most business discontinuances overlaps very little with the small business subset that generates most of the jobs produced in this sector of the economy. High failure rates do not appear to typify this latter group.

In light of the growing interest in the nature of the small business community, it is time to develop a more sophisticated understanding of small firm dynamics. The CBO data base makes it possible to test rigorously many of the generalizations that presently constitute the conventional wisdom on small business. This study is a step in that direction.